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Program Commitment Agreement

Discovery Program

June 1999

It is the responsibility of each of the signing parties to notify the other in the event that a commitment cannot be met and to indicate the timely renegotiation of the terms of this agreement.

Agreement:

Edward J. Weiler

Associate Administrator
Space Science Enterprise

10-26-99
Date

Daniel J. Goldin

Administrator

Oct 26, 1999
Date

AI1999-00126

Discovery

1. PROGRAM OBJECTIVES

The Discovery program is designed to accomplish frequent, high quality planetary science investigations, using innovative and efficient management approaches. The Program's prime objective is to enhance our understanding of the solar system as it is today and of solar system formation and history. In the process, it seeks to substantially reduce total mission cost and development time from that required by missions prior to Discovery. It endeavors to improve project performance through the use of new technology and through commitment to, and control of, design, development and operations costs. Finally, it seeks to enhance public awareness of, and appreciation for, space exploration and to incorporate educational and public outreach activities as integral parts of space science investigations.

Discovery missions are solar system science missions intended for exploration of solar system bodies, either by travelling to them or by remote examination from the vicinity of Earth. Both our solar system and the study of extrasolar planetary systems are included in this definition.

2. PROGRAM OVERVIEW

The Discovery program is an outgrowth of a Space Science Enterprise effort to develop a science program of frequent, small planetary missions that will perform high-quality scientific investigations while emphasizing those which can be accomplished under control of the scientific research community. It seeks to reduce total mission life cycle costs and improve performance through the use of new technology, through strict control of costs, and through more efficient management by assigning increased responsibility to the Principal Investigators (PI's).

The scientific goals of planetary science within the Office of Space Science (OSS) are generally contained in *The Space Science Enterprise Strategic Plan*, dated November 1997. The term "planetary science" encompasses the scientific objectives of:

- The NASA Solar System Exploration theme, and
- The search for extrasolar planetary systems elements of the NASA Astronomical Search for Origins theme.

The Discovery program customer base is centered in the planetary science community representing these space science themes. The goals and strategies outlined in the Strategic Plan encompass a wide range of scientific questions spanning many scientific disciplines. NASA seeks to address these questions by supporting investigations in several broad categories; however, the Discovery program solicits only those investigations which lead to flight projects that investigate the solar system, either *in situ* or remotely, or contribute to the search for extrasolar planetary systems. The Program is composed of a long-term series of space science missions that are independent, but share a common funding and management structure.

The Discovery program will carry out solar system flight missions, firmly controlling the total cost within an initially determined cost cap. Discovery investigations will require a careful trade-off between science and cost in order to produce missions with the highest possible science value for a given cost. Therefore, missions proposed at or near the cost cap will be selected only if the science is compelling, and evidence is provided that the cost cap will not be exceeded. Discovery seeks to achieve a balance between lower and higher cost missions that will allow a mission launch every 12 to 24 months within the Discovery funding profile. The current Discovery missions are shown in Table 1.

Table 2: Current Discovery Projects

Discovery Project Name	Mission Objective	Launch Date	Implementing Organizations	Mission Status
1. Near-Earth Asteroid Rendezvous	To orbit and study Asteroid Eros.	2/17/96	JHU APL	Arrives at Eros Feb 2000.
2. Mars Pathfinder	To land on and study Mars.	12/4/96 (Landed 7/4/97)	JPL	Mission successfully completed.
3. Lunar Prospector	To orbit and study the moon.	1/6/98	ARC/LMMS	Mission successfully completed; Now in extended ops.
4. Stardust	Comet sample return mission.	2/7/99	JPL, LMA, Univ. of Wash.	In cruise.
5. Genesis	Solar wind sample return.	Jan 2001	JPL, LMA, Cal Tech.	In development.
6. Contour	Fly by of 3 comet nuclei.	Jun 2002	JHU APL, Cornell Univ.	In development.

3. PROGRAM AUTHORITY

The Discovery Program Office is located in the NASA Management Office (NMO) at the Jet Propulsion Laboratory (JPL). Because of the competitive nature of the mission selections, the wide variety in implementing organizations, and the participation of NASA Centers on Discovery proposal teams, it was decided that the NMO would function as the Lead Center for the Discovery program. Since the NMO does not have a Program Management Council (PMC), the governing PMC for the Discovery program is the NASA PMC at Headquarters, although each individual Discovery project may be governed by a Center PMC.

To facilitate the small project oriented approach, the Discovery program has adopted a streamlined program management structure with NASA oversight and reporting requirements limited to that which is essential to assure agreed upon science return in compliance with committed cost, schedule, and performance requirements. Investigator teams will be allowed to use their own processes, procedures, and methods to the fullest extent practical, and are encouraged to develop and implement new ways of doing business when cost, schedule, and technical improvements can be achieved.

The Discovery approach encourages teaming arrangements (consortia) among industry, university and government partners which will optimize the talents of each of the organizations. Teams will be led by the PI, who will have the responsibility and accountability to accomplish the selected missions within the strict cost and schedule constraints of the Program. Teams have the flexibility to define the management approach that best suits their particular teaming arrangement.

Program authority is delegated from the Associate Administrator for Space Science (AA/OSS) through the Director of the NMO located in Pasadena, California, to the Discovery Program Manager. The PI for each Discovery project is responsible for the overall success of the project and is accountable to the AA/OSS for the scientific success and to the program manager for the programmatic success.

4. TECHNICAL PERFORMANCE COMMITMENTS

(a) The Discovery program shall launch an average of one mission per 18 months, with a goal of one per year. This performance count shall include those Missions of Opportunity selected under a Discovery Announcement of Opportunity (AO).

(b) Discovery Projects shall use a cost effective, domestic, flight proven Expendable Launch Vehicle (ELV), or they may choose to deploy as a free-flyer from the Space Shuttle. The ELVs shall cost no more than a Delta II if provided by NASA, however, a project may use a larger vehicle if the payload is

considered as a secondary or "piggyback" payload and the launch vehicle meets NASA quality and reliability standards. Foreign launch vehicles may be utilized only if contributed by the foreign organization and the launch vehicle meets NASA quality and reliability standards. NASA will not purchase launch vehicles from foreign sources.

(c) Discovery projects shall be complete missions, including provision of the instrument, science teams, spacecraft and supporting subsystems, launch vehicle, mission operations, tracking support, and data analysis and archiving. (A general Space Science provision in all AO's for allowing missions of opportunity which provide science investigations and instruments on non-NASA missions is the only exception to this requirement.)

(d) Projects shall be designed, within cost and schedule constraints, to emphasize mission success by incorporating sufficient margins, reserves, content resiliency, and descope capabilities.

(e) Once selected, failure to maintain reasonable progress in achieving the minimum science objectives on an agreed upon schedule, or failure to operate within cost commitments may be cause for termination of the project.

(f) Participation by non-US individuals and organizations as team members in the Discovery program investigation will be permitted.

(g) In addition to good science, Discovery Projects shall identify and provide technological, educational, and/or societal benefits.

(h) For each mission, launch shall take place within 35 months of the start of Implementation.

(I) The requirements of NASA Policy Directive (NPD) 7120.4A and NASA Procedures and Guidelines (NPG) 7120.5A apply to the Program as tailored by this document and the Discovery Program Plan.

(j) There will be no period of proprietary data rights for Discovery investigations. Mission teams will be allowed sufficient time (limited to 6 months) for collecting the scientific, engineering, and ancillary data and validating the scientific data prior to depositing it in the Planetary Data System.

(k) Program-level requirements on each selected Discovery mission shall be defined in an appendix to the Discovery Program Plan prior to Project Confirmation to enter Implementation.

5. SCHEDULE COMMITMENTS

Contour System Requirements Review	May 1999
Downselect for Discovery Mission #7 (From AO #3)	Jun 1999
Genesis Critical Design Review	Jun 1999
Lunar Prospector End of Mission	Jul 1999
NEAR Trajectory Correction Maneuver #19	Aug 1999
Start of Genesis Integration & Test	Nov 1999
Release of AO #4	Jan 2000
Lunar Prospector End of Project	Jan 2000
Contour Preliminary Design Review	Jan 2000
Contour Confirmation Review at HQ	Feb 2000
NEAR Orbit Insertion about Eros	Feb 2000
Stardust Deep Space Maneuver #1	Mar 2000
Proposals Due to AO #4	Apr 2000
Concept Study Selection for AO #4	Aug 2000
Genesis Ship to KSC	Oct 2000
Contour Critical Design Review	Dec 2000
Begin NEAR Low-altitude Operations	Jan 2001
Stardust Earth Gravity Assist	Jan 2001
Genesis Launch	Jan 2001
Downselect of Missions from AO #4	Feb 2001
End of NEAR Mission	Feb 2001
Release of AO #5	Jul 2001
Start of Contour Integration & Test	Aug 2001
Stardust Deep Space Maneuver #2	Nov 2001
Contour Pre-Environmental Review	Jan 2002
End of NEAR Project	Feb 2002
Contour Ship to KSC	May 2002
Contour Launch	Jun 2002
Contour Encounter Injection Burn	Aug 2002
Downselect of Missions from AO #5	Aug 2002
Completion of Stardust Interstellar Dust Collection	Dec 2002
Release of AO #6	Jan 2003
Stardust Deep Space Maneuver #3	Jul 2003
Genesis Sample Return to Earth	Aug 2003
Contour Encounter of Comet Encke	Nov 2003
Stardust Encounter of Wild-2	Jan 2004
Downselect of Missions from AO #6	Feb 2004
Release of AO #7	Jul 2004
Downselect of Missions from AO #7	Aug 2005
Stardust Sample Return to Earth	Jan 2006
Contour Encounter of Comet SW3	Jun 2006
Genesis End of Project	Jul 2007
Contour Encounter of Comet d'Arrest	Aug 2008

6. COST COMMITMENTS

The NASA design/development costs (PDR through launch plus 30 days) for each investigation shall be limited to $190 million or less (in FY99 dollars) and the overall total NASA cost shall be limited to $299 million or less (in FY99 dollars), including the launch vehicle, tracking , mission operations and data analysis. The Discovery program budget is shown in the attached Program Cost Commitments table.

7. ACQUISITION STRATEGY

To reduce the number of procurement activities the team has to perform, the Discovery program has established an acquisition strategy that contracts for whole missions (concept through delivery of the science data and analysis) versus the usual strategy of separate procurements of each individual phase. Strong emphasis will be placed on contracts with performance incentives, especially flight and science instrument performance. Discovery investigations will be selected through the AO process, where multiple investigations are selected for Phase A Concept Studies with a competitive downselect to proceed to the Phase B part of Formulation. Investigations will typically be selected to proceed from one phase to the next phase through execution of contract options based on successful technical, cost and schedule performance in previous phases. This success is measured by a NASA Space Science Confirmation Review, at the end of each contract phase, to determine whether to confirm the mission for the next phase. The Confirmation Review for proceeding from Formulation to Implementation will usually be held concurrently with or soon after the Preliminary Design Review. The NASA AA/OSS will make all final decisions to proceed to follow-on phases.

8. PROGRAMMATIC RISK AREAS

Technical, management and cost risks for each Discovery investigation will be carefully examined as part of the selection process, and accepted risks are documented in individual Project Appendices attached to the Discovery Program Plan. All technical/programmatic risks will be further reviewed as part of the Project Confirmation Review conducted during the PDR timeframe to assure risks have been reduced to an acceptable level prior to entering detailed design and development.

9. INTERNAL NASA AGREEMENTS

JPL has been tasked, as part of a contract work statement reflected in Task Plan 10-5117, dated February 25, 1999, to provide program support to the Discovery Program Office at NMO.

The Space Operations Management Office (SOMO) will support the AO and evaluation process according to the agreements in "NASA's Mission Operations and Communication Services (for Discovery Missions)" dated February 1998. Since individual projects are encouraged to use the most cost efficient communication and ground data handling services, SOMO will work with the Space Science Enterprise and individual projects when existing NASA assets are required.

The Kennedy Space Center will support the AO and evaluation process in the area of launch services, as well as provide government furnished services and products to approved Discovery projects. Each project will be supported by KSC as defined in individual project documentation.

10. EXTERNAL AGREEMENTS

There are no external agreements for the Discovery program. External agreements for individual Discovery projects will be generated when necessary and are referenced in the Project Appendices to the Discovery Program Plan.

11. INDEPENDENT EVALUATION

Since the governing PMC for the Discovery program is the NASA PMC, Discovery is subject to Independent Annual Reviews that evaluate the progress of the Program as a whole against the schedule and requirements of this PCA. No other independent evaluation is required. However, as a selected project nears the end of Formulation, if requested by the Space Science Enterprise Associate Administrator, the Space Science Support Office at Langley Research Center will organize and lead an independent Confirmation Assessment of a project's readiness to transition to Implementation.

Since Discovery projects are selected through a competitive proposal process, and firm cost caps are established upon selection, if at any time during Implementation of a project, the estimated cost-to-complete exceeds the firm cost cap, the Discovery project is subject to a termination review. Cost increases that are completely beyond the control of the Principal Investigator and Project may be an exception that could result in an increase to the cost cap, subject to approval by the Space Science Associate Administrator, without causing a termination review, and documented in the appropriate Program Plan appendix. Any resultant changes to the overall Discovery Program costs will be reflected in an approved change to the PCA.

12. TAILORING

The requirements of NASA Policy Directive 7120.4A and NASA Procedures and Guidelines 7120.5A are tailored to effect frequent, low-cost, focused planetary missions that will perform high-quality scientific investigations. The Discovery program has adopted a streamlined program management structure, with NASA oversight and reporting requirements limited to that which is essential to assure agreed upon science return in compliance with committed cost, schedule, and performance requirements. Investigator teams will be allowed to use their own processes, procedures, and methods to the fullest extent practical, and are encouraged to develop and implement new ways of doing business when cost, schedule, and technical improvements can be achieved. For example, earned value management will be done only if it is the standard practice of the implementing organization. The intention is to reduce total mission life cycle costs and improve performance through the use of new technology, strict cost control, requirements control, and more efficient management by assigning increased responsibility to the PI's.

The Discovery program will select projects as detailed in Section 7, Acquisition Strategy, above. Each Project of the Discovery program, chosen from a competitive Phase A downselect, will be subject to a Confirmation Review with the AA/OSS for approval to enter Implementation (Phase C). This Confirmation Review takes the place of the Non-Advocate Review referenced in NPG 7120.5A. Additional project-specific tailoring will be documented in the relevant Project Appendix to the Discovery Program Plan.

13. PCA Activities Log

Date	Event	Change	Addendum	Cancellation Review Req'd	EAA Signature	Administrator Signature

PROGRAM COST COMMITMENTS (PCC), $M FOR DISCOVERY MISSIONS										
COST COMMITMENT CATEGORIES		FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	BTC	Responsible AA Signature
DEVELOPMENT										
	Phase A-D	76.5	93.6	137.6	102.7	141.5	153.0	147.6	cont.	
OPERATIONS & DATA ANALYSIS										
	Operations	7.3	9.9	4.6	3.0	3.2	4.6	3.9	cont.	
	Data Analysis	12.4	10.2	7.5	11.2	9.0	15.4	15.6	cont.	
	Totals	19.7	20.1	12.1	14.2	12.2	20.0	19.5	cont.	
OTHER	CofF									
	Launch Services	23.5	30.3	42.9	43.5	50.5	60.1	57.6	cont.	
	Tracking & Data	0.2	0.2	0.2	0.7	0.5	0.5			
	Totals	23.7	30.5	43.1	44.2	51.0	60.6	57.6		
	Totals (PCC)	119.9	144.2	192.8	161.1	204.7	233.6	224.7		

NOTES:

All figures reflect the FY 2000 PFP and the FY 1999 Operating Plan dated April 26, 1999.